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ALASKA-CEDAR

Alaska-cedar, one of the most durable of American woods, has a fine, even texture, straight grain, and clear yellow color. The principal uses are for specialty products, boats, interior trim, outdoor uses, and heavy construction—wherever durability, acid resistance, stability, smooth-wearing qualities, and workability are needed. Production has been low in the past, largely because the species is scattered and the cost of logging is high. But as logging for other species progresses to poorer sites and higher elevations, production is increasing. Efforts are being made to market lower grades, and domestic use is expanding. Much of the lumber and logs is now exported to Japan.

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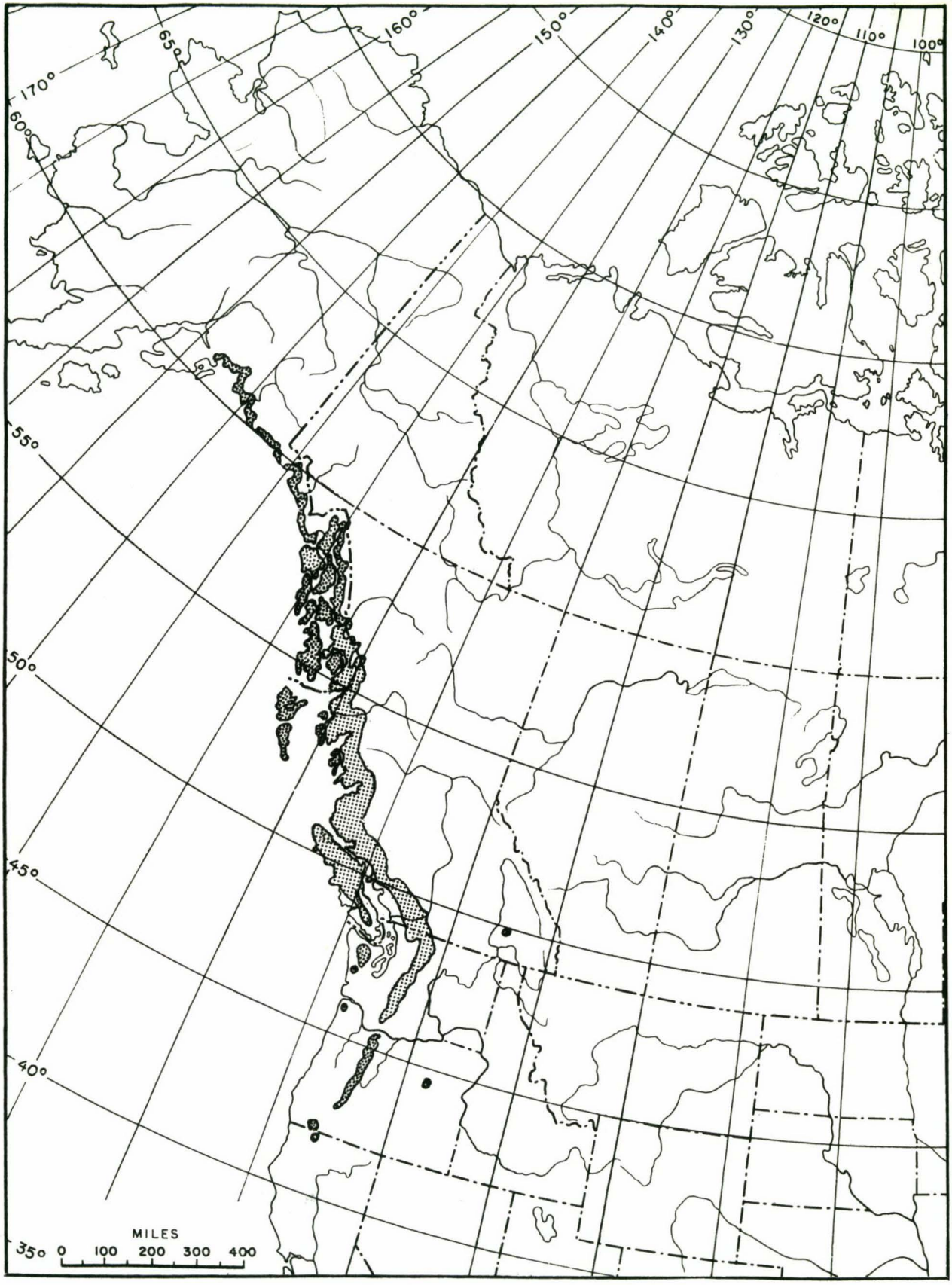

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Figure 1.—Natural range for Alaska-cedar.

ALASKA-CEDAR

(Chamaecyparis nootkatensis)

A. S. Harris [1]

DISTRIBUTION

The natural range of Alaska-cedar extends from northern California through Oregon, Washington and British Columbia, to Prince William Sound in Alaska (fig. 1). Except for a few isolated stands, it usually grows within 100 miles of the coast. The southernmost appearance is at Mount Emily and Mount Grayback in Siskiyou County, California, near the Oregon border.

In Oregon and Washington, Alaska-cedar occurs in the Cascade Range at elevations of 2,000 to 7,500 feet. It normally grows on west facing slopes, but has been seen on east facing slopes. In Washington, Alaska-cedar grows in the Olympic Mountains from ridgetops down to lowlands near river mouths facing the sea.

From British Columbia northward to Alaska's Prince William Sound, Alaska-cedar grows in a narrow band on the islands and mainland along the coast. An exception in interior British Columbia is an isolated stand near Slocan Lake, about 450 miles inland, at an elevation of 5,100 feet. The tree reaches sea level at Knight Inlet, and from there to the northwestern limits of its range at Port Wells in Prince William Sound, trees occur from sea level to timberline.

In some places Alaska-cedar grows in pure stands, but generally it is mixed with a variety of species. Its associates vary with latitude, and within their respective ranges, it may be seen with Shasta red fir, Brewer spruce, incense-cedar, Pacific yew, western white pine, western and mountain hemlock, Sitka spruce, subalpine fir, Pacific silver fir, Engelmann spruce, western larch, white spruce, western redcedar, lodgepole pine, Douglas-fir, and other species.

Alaska-cedar is confined to a cool, humid climate. Growing seasons are short, but winter temperatures are not exceptionally severe. Snowfall is heavy over much of its range. Alaska-cedar grows generally on poor sites. In Alaska, the species rarely grows on deep, well-drained soils, apparently because it cannot compete with western hemlock and Sitka spruce on the better sites.

DESCRIPTION AND GROWTH

Alaska-cedar is one of the slowest growing trees in North America. A growth rate of 50 to 60 rings per inch is common, although 80 rings per inch is not uncommon, and 360 rings per inch has been noted. This slow growth rate, coupled with the durability of the wood, gives the tree great longevity. Sound trees 700 to 1,200 years old are fairly common, and ring counts on the outer shell of hollow veterans indicate age ranging from 3,500 to 4,000 years.

Growth at timberline is especially slow, and the form may be reduced to that of a sprawling shrub. Roots may reach out 100 feet, much of the distance on the surface. Root sprouting and the rooting of buried branches are common. The tree survives heavy snow loads because of its narrow, flexible crown and drooping branches, and its supple character enables it to survive on avalanche tracks.

In Washington mature trees on better sites are typically 100 to 125 feet tall; in British Columbia they are comonly 3 feet in diameter and 75 to 100 feet tall. Trees tend to be smaller in Alaska where they average about 2 feet in diameter and 80 feet tall, although some trees are 4 feet in diameter and 100 feet tall. The largest specimen on record is in Mount Rainier National Park, Washington. It is 8.1 feet in diameter, 134 feet tall, and has a 25-foot spread.

Trunks may be fluted and swollen at the base; and where growth is especially slow, they taper sharply. Many trees lean slightly. The bark on old trees is ½ to ¾ inch thick, is ashy brown or gray on the outside, cinnamon brown when broken. The bark surface is irregularly broken by shallow, vertical seams, between which the bark separates and curls into narrow flakes (fig. 2). On the protected side of slightly leaning trees, bark flaking is pronounced; but on the unprotected side, bark is generally weathered to a fibrous and matted condition.

The small, scalelike leaves are closely appressed in an overlapping pattern of four rows, giving a squarish

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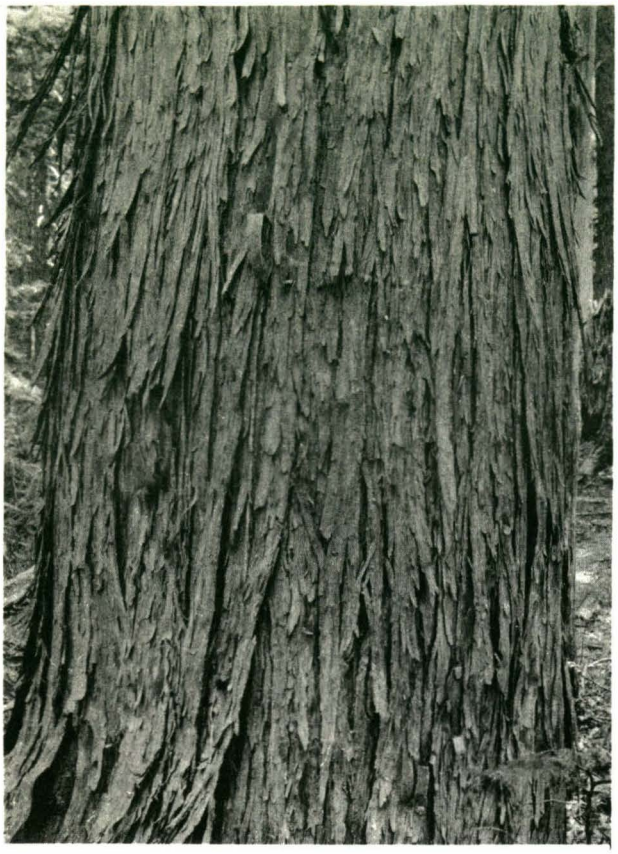

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Figure 2.—Bark of Alaska-cedar.

cross section to the branchlets. Leaves are dull blue green or gray green, and have distinctive sharp, prickly, spreading points. Branchlets hang down from heavy branches in flattened, fernlike sprays, giving the tree a weeping appearance. The crown is narrow and conical; in some trees it looks ragged because of widely separated branchlets. When trees are small, the leader is slender and whiplike.

Flowering occurs from April in the southern part of the range to June in the north. In Alaska seeds ripen in mid-September and are shed during dry periods in the fall and early winter. Empty cones may remain on the tree for several years.

Mature cones are about ½ inch in diameter, are globe shaped, and have spikes jutting out from the scales (fig. 3). The cones are light green at first, but change gradually to yellow brown and to brown as they mature. Cones generally develop in 2 years, but in the southern part of the range they are likely to mature in 1 year. Both first- and second-year cones may occur on the same branch.

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Figure 3.—Cones and foliage of Alaska-cedar.

COMMON NAMES

Alaska-cedar is the approved common name in the United States; yellow cedar is the common name approved by the Dominion Botanist in Canada. Recent Canadian trade names are Pacific Coast cypress and Pacific Coast yellow-cedar. Other common names are Alaska yellow-cedar, yellow cypress, Nootka false-cypress, Sitka cypress, Nootka cypress, Nootka Sound cypress, Alaska ground cypress, Alaska cypress, and canoe cedar.

RELATED COMMERCIAL SPECIES

Related species in the United States are Port-Orford-cedar (*Chamaecyparis lawsoniana*) and Atlantic white-cedar (*Chamaecyparis thyoides*). The three American species are quite similar in external appearance, and their woods are so closely related that they must be distinguished by microscopic examination.

SUPPLY

In 1966 the total stand of Alaska-cedar growing stock[2] was estimated to be about 5,300 million cubic feet. Sawtimber[3] was estimated at about 19,800 million board feet. About 75 percent of the sawtimber volume is in British Columbia, 22 percent is in Alaska, and 3 percent is in Washington and Oregon.

[2] Gross cubic-foot volume of trees 5-inch diameter breast high and over to a 4-inch top diameter inside bark (4-inch d.b.h. and over in Canada).

[3] Net sawtimber volume of trees 11-inch d.b.h. and over (10-inch d.b.h. and over in Canada) to a top d.i.b. of 40 percent of d.b.h. (minimum, 8 inches).

Because it is scattered and at high elevations, much of the timber is inaccessible. But as logging moves to higher elevations and poorer sites, more Alaska-cedar is becoming available. There is little reliable information on the amount of timber accessible now.

PRODUCTION

Long-term production statistics are not available because in many reports the cut of Alaska-cedar was combined with that of western redcedar and other softwoods. Production has been limited and the supply erratic over the years. As demand for other species forces cutting into ever-poorer sites and more remote locations, increased production of Alaska-cedar is expected. In the past only select trees in the better stands were logged; now, much of the harvest results from clear cutting stands for pulpwood. As lower grade logs are produced, marketing practices are changing, and uses are being developed for lower quality lumber.

Only a small amount of Alaska-cedar now finds its way into the domestic market in the United States and Canada. Much of the annual cut is exported, chiefly to Japan, in the form of green lumber and logs.

From 1963 to 1965, 96 percent of the annual cut came from British Columbia, 3 percent from Alaska, and 1 percent from Washington and Oregon combined. Production figures by year were

	1963	1964	1965
	Thousand board feet		
Washington-Oregon	500	500	500
British Columbia	53,253	53,890	61,026
Alaska	1,586	2,350	1,333
Total	55,339	56,740	62,859

In 1965 Alaska log production by grade was: peelers, 3 percent; No. 1, 4 percent; No. 2, 52 percent; and No. 3, 41 percent.

CHARACTERISTICS AND PROPERTIES

The wood of Alaska-cedar resembles that of Port-Orford-cedar and Atlantic white-cedar in appearance and properties. The heartwood is, bright, clear, sulfur yellow. The sapwood is narrow, white to yellowish, and is difficult to distinguish from the heartwood. Annual growth rings are faintly visible in flat-grained lumber or rotary-cut veneer and are virtually absent in vertical-grained lumber. The wood is fine textured and straight grained. It is classed as moderately heavy; it is moderate in strength, stiffness, and hardness; and it is moderately high in shock resistance. The average specific gravity is 0.42, based on ovendry weight and green volume. The average weight air-dry (12-percent moisture content) is 29 pounds per cubic foot.

The wood is high in oil content and is strongly aromatic. The odor has been described as resembling raw potatoes or turnips and serves to identify Alaska-cedar at once. Because of the high oil content, electrical moisture meters may fail to give true values without special calibration.

Springwood is firmer in relation to summerwood than in most species. This gives the wood a uniform texture not common in softwoods and makes it ideal for carving, veneers, joinery, and in any product where smooth wear is desirable. It works well by hand or machine tools, and it has a slightly dulling effect on cutting edges. The wood takes a smooth finish, but where the grain is wavy there is a slight tendency to "pick up" in planing.

Nail-holding power is not as good as in other woods of equal density but improves with aging.

Alaska-cedar glues well under controlled conditions, more easily with resin glues than with nonresin glues. Some users recommend washing surfaces with heated turpentine before gluing. Tests made of laminated Alaska-cedar bonded with resorcinol-phenolformaldehyde glues showed that, although it delaminated more readily than other woods of similar densities, it will stand up satisfactorily under weathering tests for at least 18 months. Laminated Alaska-cedar is acceptable for marine uses.

Alaska-cedar seasons readily, and 1-inch and 1½-inch lumber may be kiln-dried by the same schedule as for western redcedar, with an estimated drying time of 4½ to 6 days to achieve 7-percent moisture content. For 2-inch stock an estimated drying time of 5 to 7 days is needed to achieve 8-percent moisture content. When properly dried the wood stays in place well and has little tendency to shrink or swell. Some longitudinal shrinkage may occur if compression wood is present; and although kiln-drying helps to relieve stresses, it will not completely eliminate them. Careful selection to avoid compression wood is recommended for long, narrow stock.

Alaska-cedar is extremely durable. The heartwood is reputed to be resistant to attack by marine borers. For a long time the wood has been used in ship construction, and records show that after 15 years' service under severe conditions, Alaska-cedar remained sound when other timbers in contact with it had to be replaced. The wood has been used in Japan for temples because of its resistance to termites.

The reason for its great durability lies in the chemistry of the heartwood. Among the many chemical compounds that have been extracted, a tropolene,

nootkatin, inhibits fungal growth at 0.001- to 0.002-percent concentrations. Durability is affected by heating; when the wood is heated for 1 hour at 300° F., its durability may be lowered by 25 percent.

Because of its natural durability the wood is seldom treated, and little information is available on preservatives. In tests, some difficulty has been experienced with preservative penetration because of the high natural oil content.

Alaska-cedar is in the top category of woods on which paints give good service, and paints adhere well when applied correctly. However, in Alaska some trouble with paint holding on boats in service has been reported, possibly because the wet climate makes drying the wood before painting difficult. The natural oil prevents the wood from absorbing oil-based paints readily, especially after kiln-drying; and care must be taken to prepare the surface before painting. Where good paint and varnish adhesion is essential, as in boat use, surfaces may be heated and dried with a blowtorch, then primed with red lead before applying the final coats. Another method is to expose surfaces as long as convenient, then prime with paint or varnish heavily diluted with pure turpentine. More drying time is needed after painting than with most other softwoods.

Alaska-cedar has good insulating properties and is more resistant to fire than some species. In direct pressurized flame tests where 1⅝-inch-thick roof decking was subjected to a gas flame, the average flame breakthrough times were 22 minutes for western redcedar, 26 minutes for Douglas-fir, and 44 minutes for Alaska-cedar.

PRINCIPAL USES

Because of its durability, resistance to acid, smooth-wearing quality, stability, and workability, Alaska-cedar has a wide range of uses. Its value in shipbuilding has long been recognized. The Indians of the northwest coast of North America carved canoes from it, and the Russian colonists of Alaska used it in constructing the hulls of some 20 steamers built at their Sitka shipyards between 1840 and 1863. The wood is now used in boatbuilding for canoes, racing shells, skiffs, fishing boats, tugs, scows, barges, and yachts.

Outdoor uses include garden furniture, greenhouses, window frames, window boxes, window screens, stadium seats, bleachers, power poles, and marine piling. Industrial uses include water tanks, cooling towers, acid storage tanks, vats, chemical containers, benches, walks, and other uses where contact with acid is likely.

Alaska-cedar is used where severe exposure to weather, heavy traffic, and shock loads are encountered, such as for heavy flooring, bridge and dock decking, road culverts, and bedding for heavy machinery. Other construction uses include framing, roof decking, exposed beams and posts, and concrete forms.

Interior uses are for molding, sash, doors, furniture, cabinets, shelving, paneling, and flooring. Miscellaneous uses are for battery separators, turned articles, canoe paddles, patterns, veneer core stock, toys, and musical instruments.

Alaska-cedar has been used as lining for closets and boxes to repel moths, and in the 19th century it was prized in China where it was imported and made into trunks and chests under the name of camphor wood.

The wood was used in many ways by the northwest Indians of British Columbia and Alaska—for canoes, canoe paddles, totem poles, fishhooks, masks, hats, and rattles. The bark was used in basketry, twisted into string or rope, and when mixed with mountain goat wool, it was woven into blankets.

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